

WINTER 2018 NEWSLETTER



Director:
Dr. Cynthia K. Thompson

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Brain stimulation: How can TMS and tDCS help people with Aphasia?

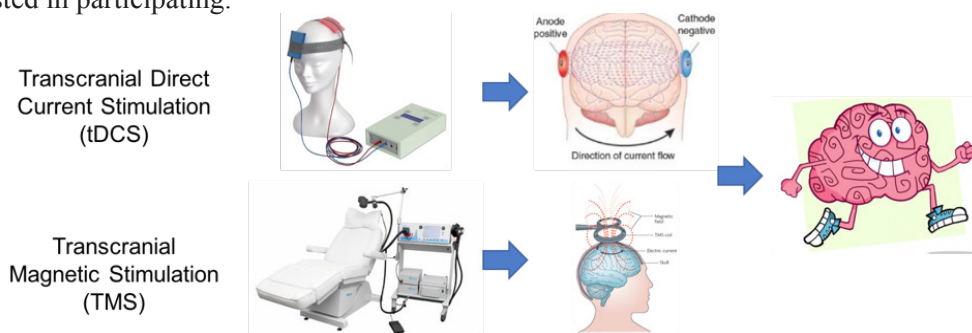
by Drs. Kaitlyn Litcofsky and Cynthia Thompson

Treatment for language impairment in people with aphasia typically focuses on improving language using targeted therapy procedures. Recently, research has shown that two types of non-invasive brain stimulation (NIBS) may boost the effects of therapy. NIBS methods include Transcranial Direct Current Stimulation (tDCS), which uses electrical signals, and Transcranial Magnetic Stimulation (TMS), which uses magnetic stimulation to deliver input to certain brain regions. These methods are thought to change how brain cells communicate with each other and thus change the way the brain functions. These techniques do not require surgery, no objects or substances enter the brain or head, and they have few, if any, side effects.

In tDCS, an anodal, or positive, electrode is placed over the brain region supporting a specific function being targeted (see Figure). A second cathodal, or negative, electrode is placed over an unrelated brain region and a small electrical current is passed between them, like the positive and negative ends of a battery. Studies using tDCS have shown improvements in motor function, depression, and aphasia. tDCS has also been used to treat Alzheimer’s and Parkinson’s disease. tDCS research in aphasia has mostly targeted picture naming. Participants first name pictures, then receive brain stimulation, then name pictures again. Improvement in the number and timing of pictures named has been shown to be greater after simulation than before.

In TMS, a hand-held coil is placed on the target region (see Figure). Participants must first complete an MRI scan to get an image of their brain structure, which is used to guide the coil to the correct location. TMS is FDA-approved as an official treatment for depression and research with other disorders has shown results similar to those noted with tDCS. Aphasia research with TMS has primarily focused on improving naming, but some studies have examined other language processes, such as auditory comprehension and verbal fluency, and have shown beneficial effects. In addition, research has shown that the effects of TMS treatment can sometimes last for several months.

Both of these techniques show very promising findings, but more research is needed to understand the impact of tDCS and TMS on different language functions, from stimulation of different brain regions, and with different language treatment paradigms. The Aphasia Lab will be designing experiments using these methods to improve sentence processing in people with aphasia. We will be looking for participants shortly so please contact the lab if you are or know a person with aphasia who may be interested in participating.



Schematic of tDCS and TMS brain stimulation methodologies

SUPPORT GROUP INFO & CURRENT EVENTS

Aphasia Support Group Meetings

GENERAL INFORMATION:

Aphasia Support Group Meetings are held the first Thursday of each month (except for January and August) from 12:00pm to 1:00pm in Room 1-530 of the Center for Audiology, Speech Language, and Learning Building - 2315 Campus Drive. Please contact Mary Cosic for more information at 847-467-7591 or m-cosic@northwestern.edu

PUBLIC TRANSPORTATION:

The lab is located three blocks east of the Noyes Stop on the Purple Line.

CTA: 1-888-968-7282
www.transitchicago.com

RTA: 1-312-836-7000
www.rtachicago.com

UPCOMING MEETINGS:

- February 1st
- March 1st
- April 5th
- May 3rd
- June 7th
- July 5th

Do you have a story to tell?

We'd like to know!

If you would like submit a piece to be featured in an upcoming ANRL newsletter, please contact Kathy and Emma 847-467-7591. Possible topics include tips and advice, hobbies (e.g. cooking, crafts, etc.), health, research, and your personal experience with aphasia.



IN THE NEWS:

Aphasia recovery via speech therapy related to structural plasticity of the ventral stream. Dr. Leonardo Bonilha and his team at the Medical University of South Carolina (MUSC) used magnetic resonance imaging (MRI) to explore how the white matter (structural connections between regions of the brain) recovers after stroke. Eight people with aphasia were tested for their naming ability and underwent MRI sessions before and after receiving intensive speech therapy. The results showed that the participants' naming ability improved as their structural network got stronger. Emilie T. McKinnon, a doctoral candidate in MUSC's Department of Neurology, hopes these findings will be a step closer to being able to look at a person's MRI to find their residual strengths, and ultimately contribute to therapeutic decision-making. (https://www.eurekalert.org/pub_releases/2017-07/muos-arv071017.php)

Dementia research leads to potential new stroke treatment. Researchers at Sichuan University in China and the Florey Institute of Neuroscience and Mental Health in Melbourne have found a new potential treatment for stroke. Research on mice showed that the tau protein, which transports iron out of brain cells, is involved in stroke. Lower tau levels lead to a build-up of iron in cells, which causes brain cell death. The researchers used an experimental drug on the mice that lowered iron levels in brain cells after stroke, which reduced the damage brain area by more than half. Mice that were treated with the drug also performed significantly better on motor and cognitive tasks. This exciting research could open up a new avenue for treating acute stroke. The new drug is delivered through the nose, which allows for rapid uptake and could be administered by paramedics for fast recovery. (<https://www.agedcareguide.com.au/talking-aged-care/dementia-research-leads-to-potential-new-stroke-treatment>)

Virtual Reality Therapy Designed to Help Stroke Patients Recover. MindMaze, a neurotechnology company, is testing a new therapy for motor impairments in stroke that utilizes virtual reality. The therapy, called MindMotion Pro, uses upper body neurorehabilitation early post stroke, and can even be done in a hospital bed. MindMotion Pro creates customized interactive exercises that turn simple, boring repetitive movements into enjoyable games by incorporating 3D avatars, motion-tracking cameras, and virtual reality environments. Therapies that use virtual reality have the potential to be more beneficial than traditional exercise-based therapies because they target both the body and the brain. In the future, the company hopes to develop virtual reality therapies that target other neurological diseases. (<https://www.rdmag.com/article/2017/08/virtual-reality-therapy-designed-help-stroke-patients-recover>)

How do dreams affect brain disorders? Dr. John Peever and his team at the University of Toronto have found that there is a link between REM sleep disorders and several neurodegenerative diseases, including Parkinson's disease and Lewy body dementia. The research suggests that certain neurodegenerative diseases target the same neural circuits that control REM sleep, the portion of the sleep cycle during which dreams occur. Dr. Peever hopes that by continuing to characterize the root cause for this link, the medical community will be able to provide preventative therapies for people with REM disorders. (<https://www.medicalnewstoday.com/articles/317658.php?sr>)

PEOPLE TO KNOW & COMMUNITY EVENTS

Featured Lab Members:



Dr. Kaitlyn Litcofsky

Kaitlyn is a new post-doctoral fellow in the Aphasia and Neurolinguistics Research lab. She earned a BS degree from Tufts University in Bio-Psychology. There, she studied how English-French bilinguals understand sentences that switch back-and-forth between their languages using EEG methodology. Before continuing to graduate school, she worked as a research assistant/lab manager in the Brain and Language Lab at Georgetown University where she gained valuable research and lab management skills. She recently earned her PhD in Psychology and Language Science from Penn State University. There, she used EEG and behavioral methods to study how speaking and listening relate to each other within an individual in monologue and two dialogue contexts – dialogue with a native English speaker and dialogue with a foreign-accented speaker. Here at Northwestern, Kaitlyn is looking forward to studying sentence processing difficulties in people with aphasia and how different treatment techniques may improve their language processing, as well as learning new research techniques, including as eye-tracking and MRI. She is originally from New York, has lived in Boston, DC, State College, France and Spain. Kaitlyn loves travelling and is now enjoying exploring Chicago. When not outside, she enjoys cooking and baking.



Brianne Chiappetta

Brianne Chiappetta (formerly Dougherty!) is a first-year doctoral student in the Aphasia Lab. Prior to starting the PhD program, she worked in the Aphasia Lab as a research technician for four years. She is especially interested in studying music and language processing and hopes to gain a better understanding of how music and language are represented in the brain, how these processes are similar to or different from each other, and how they interact with memory and attention. Before joining the Aphasia Lab, she earned her Bachelor's degree in Neuroscience from the University of Illinois at Chicago where she worked as a research assistant in the Memory Lab. She grew up on the northwest side of Chicago and loves drawing, baking, and of course watching Netflix!

Community events:

Orchid Show

February 10th-March 25th, 2018

See 10,000 blooming orchids at the Orchid Show, with morning music Tuesdays & Thursdays, orchid sales certain days, and an Evening with Orchids cocktail tasting at Chicago Botanic Garden.

Neighborhoods of the World

February-March 2018

Enjoy folk music, traditional dance, food, and crafts of different countries including China, Brazil, Italy and more at Neighborhoods of the World in the Crystal Gardens at Navy Pier. Free.

Money Smart Week

April 21-28, 2018

Money Smart Week is a series of classes and activities designed to help you better manage your personal finances. Search for events near your zip code. Free.

Barbecue

May 25 - 27, 2018

Billed as the state's largest BBQ competition, Red, White, and Bar-B-Q has live music, craft vendors, a carnival, beer tent, and barbecue in Westmont. Free.

Promenade of Art

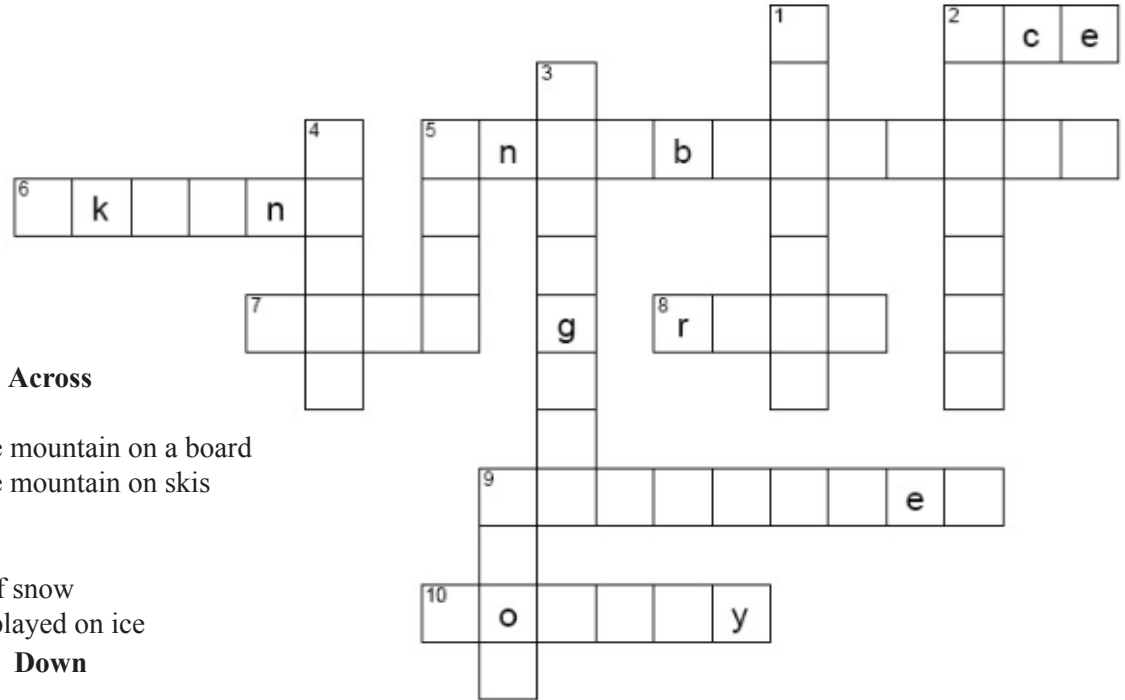
June 9-10, 2018

Shop from 100 artists, taste restaurant food, hear live music, and check out the activities for kids at Promenade of Art in Arlington Heights. Free.

ACTIVITIES CORNER

Winter Crossword Puzzle

Complete the crossword by filling in a word that fits each clue.



Across

- 2. Frozen water
- 5. Sport—going down the mountain on a board
- 6. Sport—going down the mountain on skis
- 7. Opposite of HOT
- 8. Where you ice-skate
- 9. Shoes to walk on top of snow
- 10. Popular winter sport played on ice

Down

- 1. Sliding on ice
- 2. These are formed by dripping water that freezes
- 3. Downhill fun on this simple type of sled
- 4. Winter house made of ice blocks
- 5. Pulled over snow by horses or dogs
- 9. White flakes from the clouds

Answers to across:
 2. Ice
 5. Snowboarding
 6. Skiing
 7. Cold
 8. Rink
 9. Snowshoes
 10. Hockey

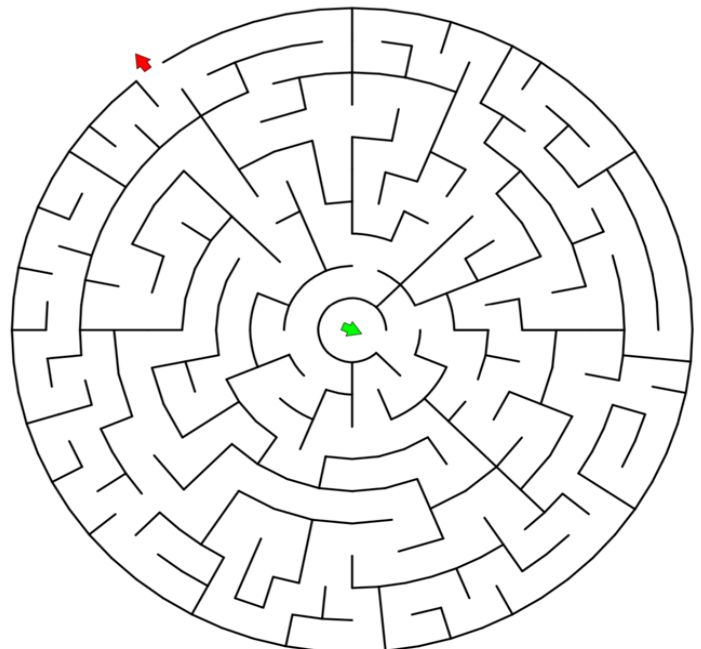
Answers to down:
 1. Snow
 2. Icicles
 3. Toboggan
 4. Igloo
 5. Sled

Sudoku

Place the numbers 1 to 9 in the empty squares so that each row, each column and each 3x3 box contains the same number only once.

								9
8			3				1	4
7			9	4	6	8		3
6	7	3		8	4	9		
		5	7		1	4		
		9	5	6		2	8	7
5		4	1	2	9			8
3	1				5			2
9								

Start in the center and find your way out of the maze!



The crossword is from <http://www.teachchildrenesl.com/worksheets/winter-crossword-puzzles/winter-crossword-puzzles.pdf>
 The sudoku puzzle is from <https://www.puzzles-to-print.com/printable-sudokus/easy/easy-sudoku-03.pdf>
 The maze is from https://krazydad.com/mazes/files/KD_Mazes_EZ_v23.pdf